
Growing WILD

Spring/Summer 2003

Utah's Project WILD Newsletter



Hooray for Humminbirds!

I, like millions of North Americans who hang red-colored feeders or plant gardens full of showy, nectar-bearing flowers, am among those who treasure having hummingbirds darting and dashing about their backyard each summer. Among the most recognizable of birds, hummingbirds are especially endearing to many people. Unique in almost every aspect of their lives, be it their brilliant iridescent plumage, their astonishing abilities of flight, their specialized metabolisms, or diminutive size, hummingbirds are incredibly fascinating, to say the least.

New World Exclusives: An all American—North, Central and South—group of birds, hummingbirds are indigenous to only the Western Hemisphere. *Trochilidae* (Troe KILL ih dee), their family name comes from a bird of Greek legend that was quick enough to zoom in and out of the mouth of a crocodile without being snapped up. Members of this family, the second largest in the New World, with around 340 species (the actual count is debatable), range throughout the Americas from Alaska to Tierra de Fuego at the southern tip of South America.

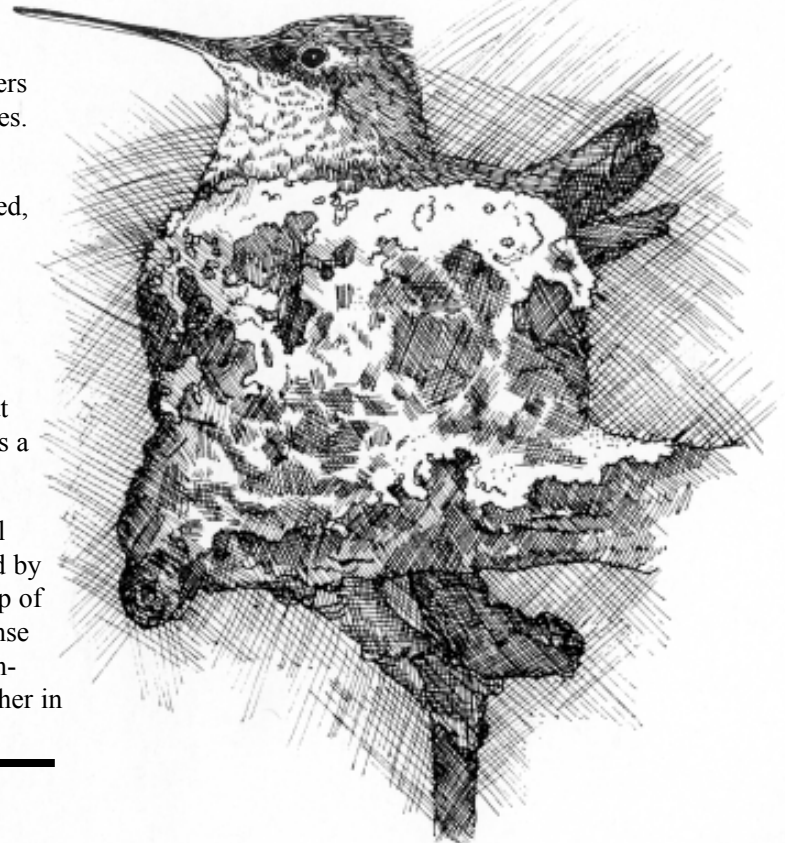
The greatest number of hummingbird species can be found near the Equator, with Columbia and Ecuador being home to the most species (about 135 and 163 species respectively). From there, the number diminishes the farther north or south one goes. Only about sixteen species nest within the United States and Canada, although most of these range just barely north of the Mexican border. About a dozen species breed regularly across the western portion of the continent, whereas only one, the ruby-throated hummingbird (*Archilochus colubris*) nests east of the Mississippi.

Despite their apparent delicateness, hummingbirds are quite hardy and highly adaptable. They seem to live wherever there is nectar to sip and insects to catch, from the frigid Andean mountaintops above 15,000 feet to the searing deserts near sea level of the American Southwest. Within their range in North America, they occupy a wide variety of ecological habitats, including deserts, mountain forests and dry scrublands in the West, and mixed and deciduous woodlands in the East.

Contrary to what one might think for such small creatures, many hummingbirds are birds of mountainous terrain. Species living in the constant warmth of the tropics and able to find year-round sources of nectar and insects within small home areas (the majority of hummers) do not migrate. Others that reside in chillier locales migrate to avoid the coldest times of the year. These tiny travelers undertake tremendous journeys often covering thousands of miles.

Diminutive but Diverse: Marvels of miniaturization, one of the most notable features of hummingbirds is their small size. Indeed, hummingbirds can boast inclusion of the smallest bird in the world, the bee hummingbird (*Calypte helinae*) of Cuba which measures only 2¼ inches from bill to tail and weighs only 0.07 ounces (about the weight of a dime). There is however considerable variation in size between species, with the largest being the giant hummingbird (*Patagona gigus*) of the Andes that reaches 8½ inches in length, tips the scales at 0.7 ounces and has a 1-foot wingspan!

There are two main groups of hummingbirds, the hermits and all the others—the “typical” hummingbirds. The hermits, classified by some in their own subfamily, Phaethornithinae, are a small group of dull plumaged hummingbirds that carry out their lives in the dense rainforests of the Amazon Basin. Within this dark, leafy environment, where sound is superior to sight, inconspicuous males gather in groups called leks and sing competitively to attract females



(continued on next page)

from the surrounding forest. Thought to possibly represent an evolutionarily older group of hummingbirds, flashiness was of no use until a point in time when a few began to move from their dimly lit abode into the light of the sun. Here, communication via the eye versus the ear became distinctly more advantageous, resulting in the transformation of somberly hued, greenish brown birds into the colorful and bedazzling hummingbirds (subfamily Trochilinae) most of us know and love.

Sequined Sun-Catchers: Described by John James Audubon as “glittering fragments of the rainbow,” hummingbirds are famous for the shimmering iridescent feathers many wear on their gorget (throat patch) and crown. Catching the rays of the sun, these magical feathers flash brilliant with bright striking colors that amaze all. Fleeting artifacts of the moment though, they fade to shadowy dark as soon as their angle with the sun is no longer on the mark.

What heavenly tints in mingling radiance!
Each rapid movement gives a different dye;
Like scales of burnished gold they dazzling show—
Now sink to shade, now like a furnace glow!”

—Alexander Wilson (early 1800s)

This spectacular satiny shine is not due to pigment in the feathers of hummingbirds. Instead, stacks of microscopic, air-filled platelets lining the outer portions of overlapping feather edges, refract and reflect sunlight like tiny prisms, giving hummingbirds a kaleidoscope of intense, jewel-like colors that range through the spectrum from red to green, purple and blue. Beyond the magnificent palette of colors different species display, elaborate crests, fancy ear fans, long streaming tails

and variously curved bills, from short to very long, enhance the diversity of hummingbirds that share our world.

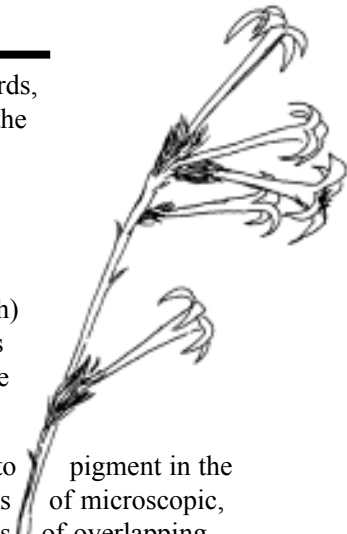
Stunt Flyers Supreme: Hummingbirds are the undisputed champions of the sky. Flying aces, they can fly forwards, backwards, sideways or straight up and down. They can wheel, roll and pivot, and stop “on a dime.” They can even fly upside down, executing a rolling, back flip somersault if needing to make a quick escape. And best of all, they can hover, a feat that can be witnessed only during a hummingbird air show.

Structural design affords hummingbirds their amazing aerial prowess. The wing of a hummingbird is practically all “hand.” If your arm was like a hummingbird wing, the upper and lower parts of your arm would be very short and rigid, and your fingers, instead, would be as long as your entire arm. You’d also be able to swivel your arm (wing) a full 180° within a very flexible shoulder joint. To hover, a hummingbird rotates its wings in the shape of a figure eight, turning its wings completely over on both the fore and backstroke to stay aloft. You can get a sense of this movement by holding your arms straight out to your sides and tracing figure eights in the air with your hands. Imagine your thumbs are the leading edges of your wings, and as you hover, your palms will be facing down on the fore strokes and up on the backstrokes. Your “wings” move much slower than those of a hummingbird though. Depending on its weight, its wing length and the flying conditions, when hovering, a hummingbird rotates its wings at a rate of about 20 to 80 times per second. Without a high-speed camera and strobe lights, all we can see is a blur. With the fastest wings in the world, during courtship dives, some hummingbirds can clock a mind-boggling 200 wingbeats per second!

Totaling about a third of a hummingbird’s weight, exceptionally large chest muscles, attached to a gigantic breastbone, unlike other birds, provide power to the hummingbird’s fast-moving wings on both the down and upstroke. When hovering, to send oxygen to its hard-working muscles, a hummingbird’s heart needs to beat about 1,200 times each minute. When not hovering its heart rate is about 500 beats per minute. Not surprising, compared to all other warm-blooded animals, hummingbirds have the largest heart relative to their size.

The humming buzz one hears when a hummingbird whizzes by is created by the structure and motion of its rapidly moving wings. As a hummingbird zips through the air, ten extra long and narrow primary feathers on each wing vibrate generating the characteristic whirring sound. Impressive indeed, many of the names given these birds around the world, including the Mayan *ts’unu’un*, the Puerto Rican *zumbador* and the Cuban *zum-zum* were inspired by this unique resonating sound. Although not very musical, hummingbirds do also have a vocal repertoire consisting of little chirps, chatters, clacks, high-pitched twitters and whistles they use to communicate with each other.

Fueling the Engine: Like a high-speed fighter jet, the cost of a hummingbird’s airborne mastery is very high fuel consumption. To sustain their super-charged existence, a hummingbird must consume more than its body weight in food each day. Having only a very small tank though, they need to refuel about every ten minutes. The primary fuel for hummingbirds is high-octane sugar-rich nectar. To satisfy their needs, these tiny sugar addicts must spend most of their waking hours foraging for nectar, visiting a thousand or more flowers over the period of a day. After feeding for about 10 to 15 minutes, a hummingbird will rest while its body digests the meal and makes room for more. Then its off to another flower fueling station.



Both the long bill and equally flowers. The end of the Flicking in and out at a rate through capillary action.

long tongue of a hummingbird are well-designed tools for extracting nectar from tongue is split and curled up into a pair of tiny tubes, each of which is also fringed. of about 13 times per second, the tubes and fringes of the tongue soak up nectar When drawn back into the bill, the nectar is sucked and scraped off the tongue.

Although a quick high-burst source of energy, hummingbirds cannot live on nectar alone. The need protein in their diet too. Active insect-catchers, hummingbirds nab insects from the air, glean them from leaves, scoop them up with nectar from the bottom of flowers, snatch them from the webs of spiders, and pluck stuck ones from the sap of trees (another source of sugar for some hummingbirds).

surface area rapidly. To

meet their daily energy seem like much compared Calories for a hummingbird is hummingbird would need 165,000 Calories per day to survive. That amount would be equivalent to a person eating a five-pound bag of table sugar every 40 minutes throughout the day!

Powering Down: Being especially tiny creatures, hummingbirds have a very high to volume ratio. This means they can lose body heat to the environment very counteract this heat loss they, in turn, have a very high metabolic rate. To needs, hummingbirds need about 10 Calories of fuel per day. That doesn't to the average 1,500 to 2,500 Calories ingested by an adult human, but 10 actually an enormous amount. A person with a metabolism comparable to that of a hummingbird would need 165,000 Calories per day to survive. That amount would be equivalent to a person eating a five-pound bag of table sugar every 40 minutes throughout the day! (Note - 1 Calorie = 1 Kilocalorie or 1,000 calories).

Since hummingbirds are unable to eat continually to get the energy needed to maintain their body temperature, on chilly nights or during cold snaps, they can instead power down their systems and enter a state of suspended animation called torpor. To conserve energy in this power-saving mode, a hummingbird dramatically lowers its body temperature from a normal of about 104° to 75° F, and slows its pulse from about 250 to 36 beats per minute. At daybreak, it powers up rapidly and starts feeding again to warm itself up.

Seeing Red: The connection between hummingbirds and the kinds of flowers they visit has over time become quite sophisticated. Wherever they travel, hummingbirds can instantly spot the flowers they like best, just like a motorist recognizes his/her favorite fast-food restaurant along the highway.

Though hummingbirds will visit flowers of all colors, they are particularly attracted to red-colored flowers. (It also happens to be that hummingbird eyes are especially perceptive of colors at the red end of the spectrum.) Tubular-shaped flowers, able to secure their nectar deep in their blossom beyond reach of insects but accessible by the slender bill and long tongue of hummingbirds are especially sought out as well. Flowers that hang in loose clusters providing plenty of maneuvering room to hover are favorites too.

Throughout the day, such flowers produce large quantities of nectar like the fast food restaurant's drive-thru. Instead of paying money at the window though, the hummingbird works for food and offers its own special flower-profitting service. In the course of gathering nectar, hummingbirds spread pollen from blossom to blossom, providing flowers the benefit of pollination.

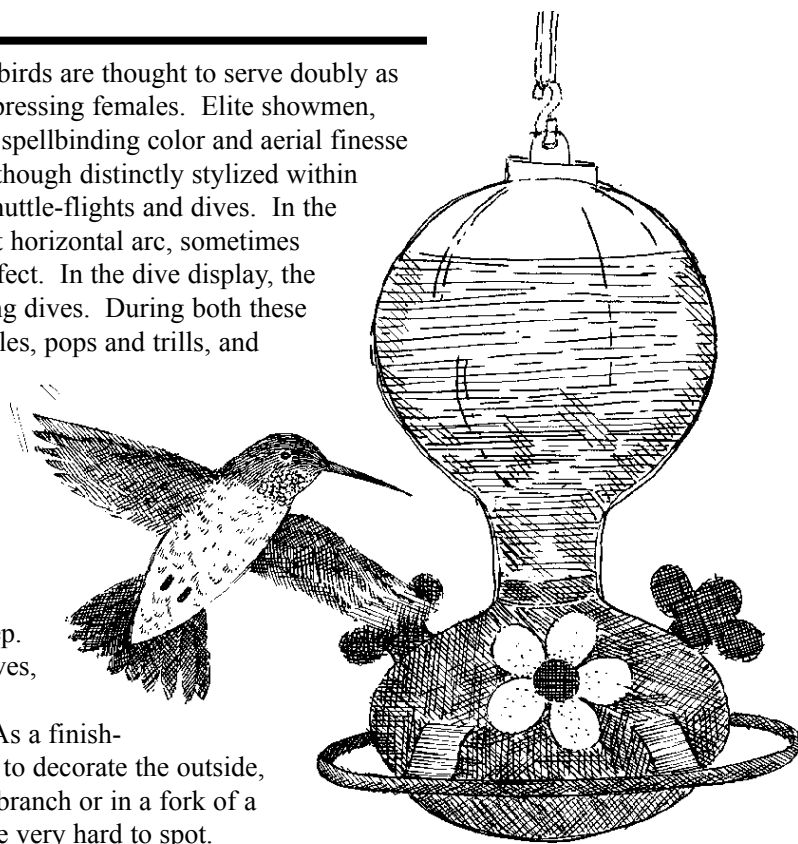
Turf Wars: Once a hummingbird stakes out a prime patch of flowers or a feeder, it will proclaim its exclusive rights to this nectar supply and defend it vigorously. Both male and female hummingbirds claim separate parcels of real estate and defend them against interlopers of any sex although males are by far the most demonstrative. Hummingbirds not only defend their territories against others of their own species, but also against other kinds of hummingbirds, other birds and sometimes moths, butterflies and bees which compete for the same nectar.

Defense of their turf entails a variety of behaviors from loud angry chattering to squeaky vocal warnings, visually impacting displays including simple fanning and flicking of tail feathers to flashing and flaunting of bright shiny gorgets, to diving and chasing aerial assaults. If threats fail, a little "muscle" might be added to the mix and aerial combat may ensue. Lacking fists, they battle in mid-air, pushing, pummeling and scratching one another with their claws, occasionally locking together, falling and scuffling on the ground. Both males and females may have feeding territories, but females also defend territories while nesting, exhibiting boldness equal to the most aggressive of males.

Energetically costly, not all hummingbirds establish and defend nectar-rich territories. Instead, some gather nectar from more widely scattered areas and spend their time flying from place to place in search of flowers with nectar. They often follow an established daily route, or "trapline" gathering food from certain broadly dispersed trees and flowers. Among hummingbirds, some species tend to be either territorial or trapliners, but most can adopt either feeding strategy at various times depending on food availability and how stiff the competition may be.

The Antics of Love: The territorial displays used by hummingbirds are thought to serve doubly as those of courtship, having the side benefit of attracting and impressing females. Elite showmen, North American male hummingbirds play on their strengths of spellbinding color and aerial finesse to lure females, engaging in elaborate exhibitions of flight. Although distinctly stylized within differing species, their aerial displays are of two basic types: shuttle-flights and dives. In the shuttle-flight display, the male sweeps back and forth in a short horizontal arc, sometimes with the feathers of the tail and gorget flared to heighten the effect. In the dive display, the male swoops through a series of oval or U-shaped death-defying dives. During both these displays, wing feathers vibrate to create an array of intense rattles, pops and trills, and colorful glittering feathers, purposefully aligned towards the rays of the sun, sparkle and shine.

Single-parent Families: Female hummingbirds have a simple role in nesting: they do everything. Before expending energy and enthusiasm on courtship, female hummingbirds build their nest. Each species forms its own unique type of nest. Those of North American hummingbirds are generally cup-shaped, less than two inches wide and a mere one inch deep. To build her nest, a blend of mosses, grasses, pine needles, leaves, rootlets, animal fur and cottony down from seeds of plants are woven and bound together, often with sticky spider web silk. As a finishing touch, sometimes bits of lichens, mosses and bark are used to decorate the outside, perfectly camouflaging the tiny affair. Saddled on a protected branch or in a fork of a tree, on a bush, or tucked in a crevice of a cactus, they often are very hard to spot.



When the nursery is nearly complete, the female seeks out a male within his territory. At first she might be chased off, the male thinking she's a rival male instead of a potential mate. Upon realizing the error of his ways, he begins showing off to win her over. When she's sufficiently impressed, the female "allows" the male to chase her toward her territory where they then engage in a quick mating encounter.

Eggs are laid shortly thereafter. Most species lay two eggs, though sometimes there are only one or up to three. Elliptical in shape, the eggs are tiny, averaging less than half an inch in length and weighing less than 0.02 ounces. About the size of a jellybean, the eggs together comprise between 10 to 20 percent of the mother's body weight. For sake of comparison, that would equate to a 130-pound woman bearing a 20-pound baby. Though different for each species, the eggs are incubated an average of 16 days. Baby hummingbirds hatch blind, featherless and totally dependent on their mother. They don't look at all like their colorful, graceful parents. They have been likened instead to "brown raisins with huge heads and eyes." Chicks are kept warm by their mother. Off and on though she has to leave them unattended to forage so they can be kept well fed.

For the first few days they are fed mainly tiny insects, providing protein for their growing bodies. As the days progress, more nectar is added to their diet. As true feathers replace scraggly down, the nestlings become capable of maintaining their body temperature, and mother no longer needs to sit on the nest (there's not even enough room for her). Fortunately, their soft flexible nest stretches to accommodate their increasing size. It has its limitations though and by three weeks after hatching, when the chicks are almost ready to fledge, the nest is barely able to keep the fully feathered youngsters from falling out. Sitting on the edge, they stretch and flap their wings as they prepare to become adept at flight. Once they have learned to fly and left the nest, their devoted mother continues to feed them for about two or three more weeks. After that they are left entirely on their own.

Come Ye, Come Ye, One and All: A well-planned garden can draw hummingbirds to your yard. Indian paintbrush, scarlet gilia, red-columbine, penstemon, horsemint and scarlet sage are just a few of the flowers you can plant to summon hummingbirds your way. There are numerous reference books and Internet sites describing how to create a haven for hummingbirds. If you're unable to have a garden full of flowers, you can also attract hummingbirds by putting out a hummingbird feeder. Fill your feeder with a solution prepared by dissolving one part table sugar in four parts water, boiling for a minute or two and letting it cool. Hang your feeder in a shady, protected place. Clean and refill it every few days to make sure the sugar solution stays fresh and free of disease-causing organisms, and don't use honey since it can cause fungal infections that damage hummingbird tongues.

If there are hummingbirds in the neighborhood, they'll probably show up soon. Then you too will be among those completely captivated by these treasured flying jewels.

Resources

Humdinger Hummingbird Resources!

Call Project WILD at (801) 538-4719

or e-mail dianavos@utah.gov

Hummingbird Resources:

Hummingbirds - Educational magazine in the "Zoobooks" series. Includes insert with great activities for kids. Send check made out to UDWR for \$2 to Project WILD, PO Box 146301, Salt Lake City, UT 84114-6301.

Hummingbird Activities - Miscellaneous activities including adaptation matching game, making a simple hummingbird feeder, and an excellent *Green Teacher* article with inquiry ideas and other fun educational activities.

Hummingbirds: Jewels of the Forest - Excellent new video available for check-out from the Project WILD Video Library. 30 minutes. Great for grades 3 and up. Lesson guide included.

Hummingbird Internet Sites:

Hummingbird Sounds - <http://www.naturesongs.com/caprpici.html#LAPOD>. Also see http://www.enature.com/search/show_search_byShape.asp?curGroupID=1&shapeID=966.

Ruby-throated Hummingbird Coloring Page - <http://www.enchantedlearning.com/subjects/birds/printouts/Hummerprintout.shtml>.

Hummingbird Lesson Plans from Journey North - <http://www.lauraerickson.com/>

[JourneyNorth.html](http://www.lauraerickson.com/JourneyNorth.html).

Hummingbird Stamps - <http://www.bird-stamps.org/species/81308.htm> (click on blue arrow to see successive stamps). Also see <http://store.coolstamps.com/endeavor/category/210.html>.

The Hummer Hotel - Variety of online videos, sounds of hummers, photos, hummingbird facts, etc. <http://members.aol.com/humerhotel/hummerindex.html>.

The Hummingbird Web Site - Includes hummingbird poetry, quiz, Q & A, gallery, legends, species natural history and more. <http://www.portalproductions.com/h/>. Another quiz - <http://birding.about.com/library/weekly/aa072401a.htm>.

Hummingbird Photo Library - <http://birding.about.com/library/blphoto-hummingbirds.htm>. More hummingbird photos- <http://amazilia.net/images/Birds/Hummingbirds/hummingbirds.htm>.

The Hummingbird Dance! - Fun animated hummingbirds and nothing more. <http://nicholenb83.tripod.com/index.html>.

Other Resources:

A Cottonwood Forest Amidst a Sagebrush Sea - A beautifully illustrated poster by Utah artist Clark Ostergaard depicting riparian habitat streaming through the dusty sagebrush expanse of the Great Basin, and the wildlife these two habitats support. Excellent educational information and activities provided on reverse side. Produced by the U.S. Fish & Wildlife Service for the National Wildlife Refuge System.

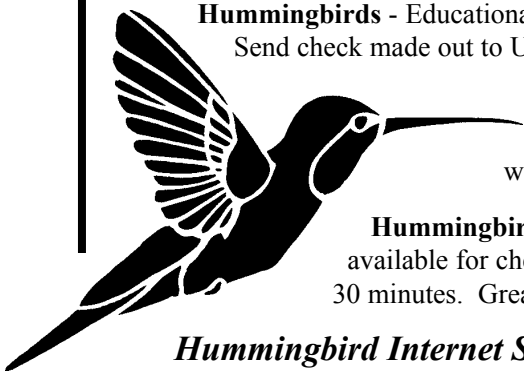
Catalysts for Conservation - A colorful and educational International Migratory Bird Day Poster for 2003 sharing the role of birds in conservation throughout history.

Gila Monsters: Creatures of Mystery and Myth - A great educational poster featuring this unique reptile of the Mojave Desert ecosystem. Produced by Arizona Department of Game and Fish.

Welcome to the Underground: Cave Ecosystems - A colorful educational poster, activities and article developed by the Bureau of Land Management looking at the features and life forms residing within caves.

Bald Eagle or Golden Eagle - Borrow a real mounted eagle from Project WILD for your students to see!

Understanding the Work of Nature; Appreciating Nature's Services; Conserving the Diversity of Life - Three excellent educator trunks each containing an easy-to-follow activity guide with instructions and background information plus maps, posters, videos, and CD-ROMs and other supplemental materials for hands-on and minds-on learning. Though designed for junior high aged students, the trunks can be adapted to any age group with a little imagination and creativity. Developed by and on loan to Project WILD for check-out from the Idaho Natural Heritage Center.



Utah's Summer Hummers

Broad-tailed Hummingbird – *Selasphorus platycercus*

The classic hummingbird of the western mountains in North America, broad-tailed hummingbirds are summer residents of high meadows and forests found at elevations of 4,000 to as high as 12,700 feet above sea level. Their breeding range the West extending from eastern California across to western Texas, and Rocky Mountains and mountain areas of the Great Basin of Idaho, Utah, Wyoming and down into Mexico. They winter in mid-elevation portions of west-central Mexico down to In Utah they are the most common hummingbird, occurring in all parts of the state.

Often heard before they are seen, males of this species literally “sing with their wings,” producing a metallic, high-pitched and constant musical trill reminiscent of rattling cicadas as they dive through the air. Specially tapered feathers at the outer edges of their wings form unique slots through which the wind whistles to create the shrill buzzing noise. Quite loud, the amazing sound generated from their wings can be heard from 75 to 100 yards away. The distinct wing-trill resounds through the sky as males perform their spectacular aerial high-climbing, diving and hovering courtship displays. It is also heard as males aggressively dive to defend their floral-decked mountain territories.

When you spot the male his metallic, iridescent rosy-magenta colored gorget and flashy green-colored sides, back and crown will catch your eye as they sparkle in the sun. The less colorful females, sporting merely a few rose-colored feathers on a bronze speckled throat, whitish undersides and buffy to slightly cinnamon washed flanks below their green feathered back, will be more difficult to see. Both, about 4 to 4½ inches in length, are medium-sized, though longer in body and wing than similar hummingbirds. As expressed by their common name, the feathers of their tails are longer and broader as well, especially when spread. Named from a specimen taken in Mexico by Swainson in 1834, the species' scientific name reflects its features as well—the Greek *selas* meaning flame and *phoros* meaning bearing, which of course refer to its brilliant gorget, and *platys* meaning broad and *kerkos* meaning tail which speak to its broad, flaring tail.

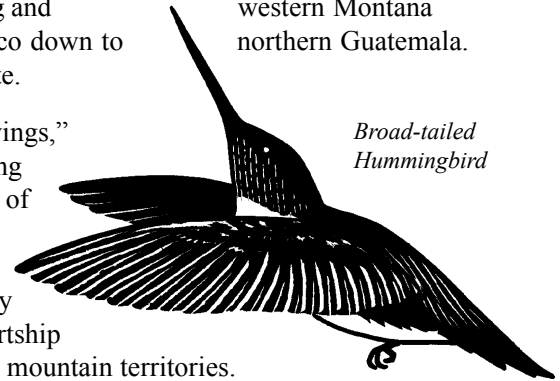
Within their breeding range, they prefer open forest areas, brushy hillsides and montane scrub thickets, especially near streams, including pine-oak and pinyon-juniper woodlands, and associations of spruce, Douglas-fir and aspen. Nests are generally found between 4 to 20 feet above the ground on a near-horizontal limb, and often overhanging a stream. They are also usually sheltered from above by a canopy of branches which help their tiny occupants conserve heat to endure the chilly mountain nights.

The outside of the nest is often camouflaged with lichens, bark fragments, and moss. The inside is typically lined with spider webbing or other soft material such as the “cotton-like” fluff associated with the cottonwood trees surrounding their riparian mountain summer home. Nests are sometimes reused by females returning to the same site in successive years, or by different females at other times. Females may take four to five days to build a new nest, though less time is needed if they chose to rebuild atop a nest from an earlier year.

Listen and look for these mountain summer hummers to arrive in Utah between late April and early May. If you are lucky you'll not only hear them trilling above, but see them zipping from flower to flower in an open meadow, snatching gnats from a passing swarm or better yet, taking a splashy dip in a shallow pool of a mountain creek.



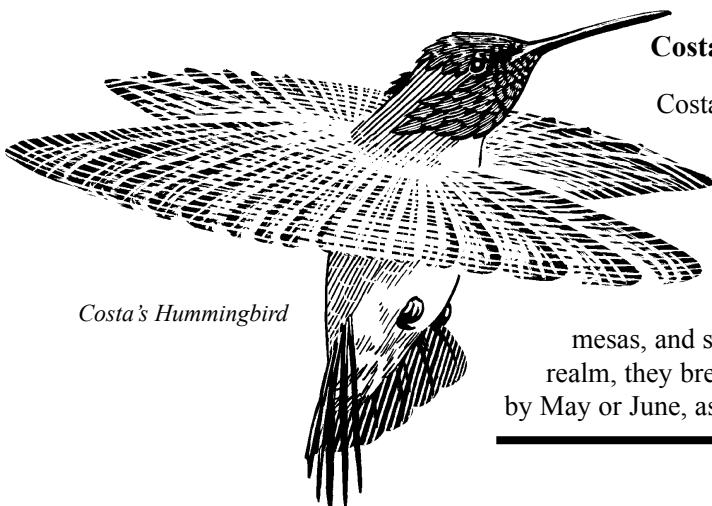
covers much of south from the western Montana northern Guatemala.



Broad-tailed Hummingbird

Costa's Hummingbird – *Calypte costae*

Costa's hummingbird is a veritable denizen of the desert. Members of this species range from southern California, southwestern Utah, Arizona and southern New Mexico southward into western Mexico and through the whole of Baja California. Less dependent on water than most other hummingbirds, they breed in the more arid regions of the Sonoran and Mojave deserts making use of chaparral shrublands, sagebrush plains, rocky arroyos, dry mesas, and sandy gravel washes. To avoid the extremes of heat in their desert realm, they breed early, with numbers peaking in March or April and tapering off by May or June, as they retreat to the Pacific Coast. Rare in Utah, they are found only



Costa's Hummingbird

within the Mojave Desert region in the very southwestern corner of the state, primarily in the Virgin River drainage. Although they are present during the breeding season, very few nests have actually been found in Utah.

Costa's hummingbirds establish territories in areas with low, even vegetation, featuring favored flowering plants such as scarlet larkspur, desert lavender, desert honeysuckle, white yucca, chuparosa and ocotillo. Within these xeric landscapes flowering plants are only sparsely scattered, so they need to defend large (in hummingbird standards) expanses of 2 to 4 acres. They prefer areas interspersed with a few taller stalks of plants or twigs upon which to perch and scan for intruders.

A large headed, but very tiny hummingbird of only about 3 to 3½ inches, Costa's hummingbird is the only North American hummingbird with long flared extensions on the sides of its gorget that drape down like the mustache of Yosemite Sam. This unique gorget as well as its crown glow vibrantly with a shimmering metallic amethyst-violet to royal-purple color. Accents of magenta, blue or even green highlight the gorget when viewed at various angles. A back and head cloaked in iridescent green feathers, a relatively short tail, and short, thin black bill that is either straight or slightly decurved complete the little bird.

Females of the species are very difficult to distinguish from females of other hummingbird species with overlapping ranges. Dressed in a coat of shiny green feathers, as are the other similar females, the Costa's females are the most pale in their general coloration, have more gray on the crown, and are the purest white below, usually having an immaculate white throat. (In about half the cases though this snowy white throat is dotted with a small patch of violet, in contrast to red, feathers.) The absence of cinnamon on their sides and tail is another clue, as is a distinct, very high, light and sharp *tik* or *tip* calling note often uttered repeatedly to produce a rapid twitter.

To threaten another hummingbird, a perched male turns towards the rival and spreads its colorful gorget. A short *chip* note or a longer whistling call made up of a single whistle or several short whistles may accompany the display. To attract a mate it performs a daring display. Rising high in the sky, often a hundred feet or more, it plunges earthward in a steep dive, whistling *whee-oo*, the whole way down. At the bottom of the dive it pulls up sharply, then swoops upward to its starting point to do it all over again. A female impressed by this display often responds with a burst of excited twitters.

For those of you may be wondering, Louis Marie Pantaleon Costa was the Marquis de Beau-Regard in 19th-Century France. Costa, a naturalist, was fascinated by hummingbirds, and owned of a large collection of specimens. In 1839, a French scientist named Bourcier, who was classifying birds, decided to name this particular hummingbird in honor of Costa to commemorate Costa's 30th birthday. Costa himself though probably never paid a visit to thank these little desert-welling hummingbirds.

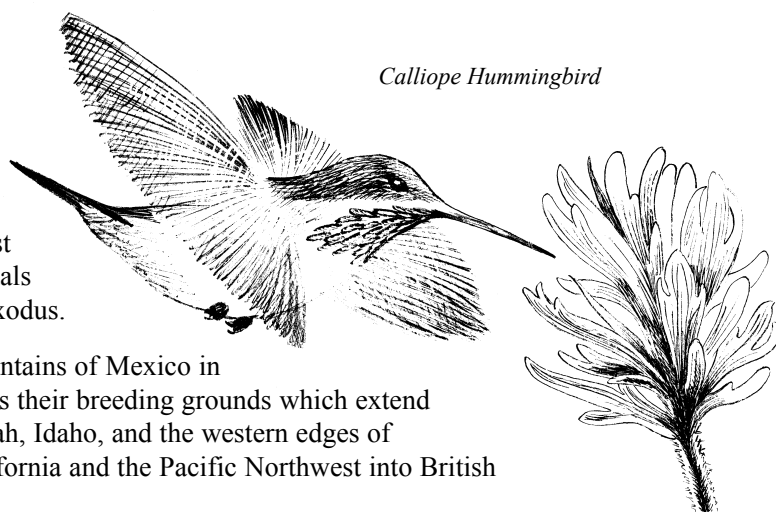
Calliope Hummingbird – *Stellula calliope*

The smallest breeding bird in North America, the calliope hummingbird measures only three or so inches short, and weighs a mere one-tenth of an ounce (2.5-2.8 grams; less than a penny). The calliope hummingbird is also the smallest long-distance avian migrant in the world with some individuals traveling 5,600 miles round-trip on their annual migratory exodus.

Leaving their pine-oak woodland wintering areas in the mountains of Mexico in early spring, they set out in a northwesterly direction towards their breeding grounds which extend from mountainous portions of the Great Basin, including Utah, Idaho, and the western edges of Wyoming and Montana, north through eastern northern California and the Pacific Northwest into British Columbia and west-central Alberta.

Despite their tiny size and heat-retention disadvantage associated with small bodies, calliope hummingbirds are predominantly hummingbirds of the mountains, able to survive and breed successfully in their chilly montane summer haunts. Occupying a broad vertical range, from typically around 4,000 feet in the northern portions of their range to 10,000 to 11,500 feet in the Rocky Mountains and Sierra Nevada, they prefer edges of meadows rimmed by conifers, or canyons and willow, alder and aspen thickets along streams. Favoring open shrubby areas, they may be more common in second growth forest areas several years after fire or logging. Although an uncommon summer resident in Utah, the species can be found in mountainous areas throughout the state.

The generic (genus) portion of the calliope hummingbird's scientific name *stellula*, which means "little star," refers to the elegant, ray-like brilliant magenta-red feathers adorning the gorgets of males of the species.

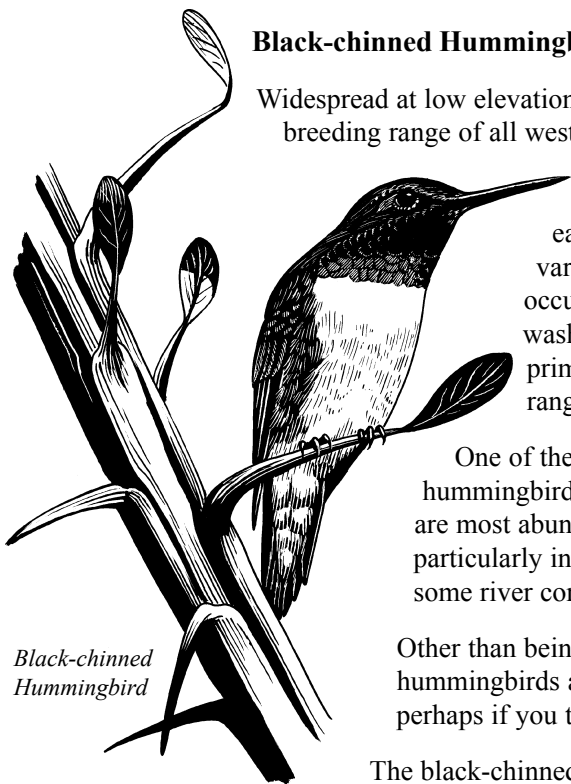


Unique to calliope hummingbirds (all other North American hummingbirds have a solid colored gorget), during courtship or territorial defense, males can elevate and flare these long, narrow feathers presenting a stunning metallic-purple, flashing starburst that stands out against the bright white background feathers of their throat.

More subdued in color, the throats of the females are freckled with dark spots. Both sexes are shiny bronze-green above and a lighter pale gray to buff below, sparsely suffused with cinnamon on the sides, flanks below the tail. Their smaller size (roughly 2/3 of other species), noticeably shorter tails, which do not reach the tips of their folded wings when perched, and short, thin, needle-like bills help to distinguish females of the species from similar other female hummingbirds one might find in areas occupied by calliope hummingbirds.

As with other hummingbirds, males of calliope hummingbirds display in earnest at the onset of the breeding season. Rising upwards, sometimes nearly out of sight, 90 some feet up, the male swoops down in a wide U-shaped dive punctuated at the bottom of the arc with a *pzzt-zing* sound. Males also hover in front and slightly above females, their wings buzzing and gorgets fanned like a blazing star. Females will often respond with tiny notes or sometimes join the male in a spinning aerial dance, bills at times locked together as they twirl.

Built in a pine, fir, spruce or hemlock, usually sheltered by an overhanging branch, and often atop a pine cone (which it tends to resemble), the nest cup of soft plant fibers built by the female is very well insulated, and often oriented towards the east to capture the warming rays of the morning sun. It has to be to ensure survival of the young she raises in the coolness of the calliope hummingbird's mountain summer home.



Black-chinned Hummingbird – *Archilochus alexandri*

Widespread at low elevations in the West, the black-chinned hummingbird can boast the most extensive breeding range of all western hummingbirds. Breeding from southwestern British Columbia and northwestern Montana south to Baja California, southern Texas and south-central Mexico and east from coastal California to western Wyoming, eastern Colorado, eastern New Mexico and central Texas, they live in a wide variety of habitats from sea level to elevations above 8,000 feet. Habitats occupied include semi-arid open woodlands, riparian woodlands, chaparral, desert washes, canyons, orchards, alpine meadows and suburban gardens. They winter primarily in Mexico, but in the recent past, appear to be expanding their wintering range eastward along the Gulf Coast from Texas to northwestern Florida.

One of the earliest hummingbirds to arrive and claim territories in spring, black-chinned hummingbirds are a common summer resident in Utah. Though common in the state, they are most abundant further south in the more southerly portions of their breeding range, particularly in riparian habitats of southern Arizona and southern New Mexico, where along some river corridors, nests may be found nearly every 300 feet.

Other than being the most widely distributed hummingbird in the West, black-chinned hummingbirds are not especially noteworthy in regards to the aspects of their lives—expect perhaps if you turn things around and note them for them being extreme generalists.

The black-chinned hummingbird is described as a small, compact hummingbird with a medium length to long, slightly decurved bill and grayish crown. The colors of both the male and female are comparatively subdued bronze-green above and dull grayish white below with sides and flanks darker and glossed with metallic bronze-green.

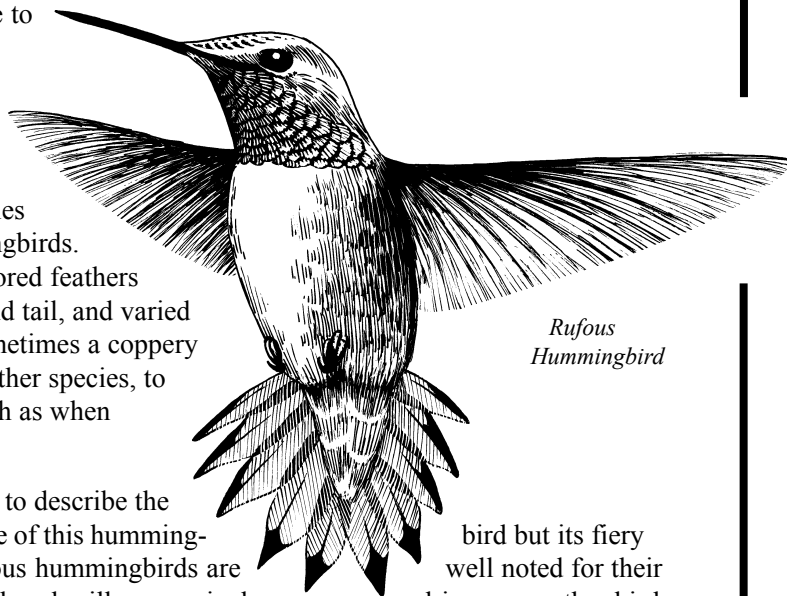
The most conspicuous feature of the male is a white collar that contrasts with a square-cut velvety black gorget, the characteristic for which the species was given its common name. When the light hits it just right, a dazzling amethyst-violet band shines below the edge of the deep black chin. The scientific name *alexandri*, given the species in 1846, honors its discoverer, Dr. M. Alexandre of Mexico. *Archilochus*, the species name is apparently after Archilochus of Paros, a 7th century Greek poet. In Greek the prefix *arch-* means chief and *lochos*, means a body of individuals, together which translate into “first among the birds.”

Female black-chinned hummingbirds can be recognized and distinguished from females of other hummingbirds by the white tipped outer tail feathers and a small white spot (also seen on the males) behind each eye. In terms of their behavior, one thing that especially stands out is their almost constant up and down pumping of their tails in flight.

Relatively tolerant of human activities and altered habitats, black-chinned hummingbirds have benefited from introduction of feeders and non-native nectar-bearing plants, becoming a common urban bird in areas where they were once uncommon to rare. This may be important to the species as threatened riparian habitats utilized for nesting and migration continue to decline across the West.

Rufous Hummingbird – *Selasphorus rufus*

The rich, rusty brown feathers and blazing scarlet-golden gorget for which the rufous hummingbird is named sets males of this species apart from all other North American hummingbirds. The less elaborate females of the species wear greenish colored feathers on their back instead, but have rufous on both their sides and tail, and varied amounts of reddish-orange speckles on their throat plus sometimes a coppery feathered gorget patch. Very similar to females of certain other species, to identify them with certainty, they must be held up close such as when banded by an ornithologist.



“A feathered ball of fire,” words used by A.C. Bent in 1940 to describe the rufous hummingbird, pertain not only to the fiery appearance of this hummingbird but its fiery temperament as well. Hummingbirds with an attitude, rufous hummingbirds are feisty nature. Particularly pugnacious, they are very vocal and will aggressively drive away other birds that attempt to approach patches of flowers or feeders in their territory. Males ward off other hummingbirds with an incessant *tchip tchip tchip* buzzing chatter, gorget flashing and fanning of their long-black-tipped rufous tail. If an intruder does not move along, the challenge may escalate. Asserting his territorial prerogative his call steps up to an emphatic *zeee’ zik’-iti zik’-iti zik’-iti* as he drives off other hummingbirds, other birds, large insects and even chipmunks.

Not only notorious for their bad disposition, rufous hummingbirds afford acclaim as the hummingbirds that venture farther north during their migration than any other species. Nesting as far north as 61° N Latitude, its breeding range stretches from coastal southwestern Alaska south through southern Yukon, most of British Columbia, southwestern Alberta, Washington, northwestern and central Idaho, western Montana, and into extreme northwestern California. During the breeding season, they occupy forest openings, edges and brushy growth in conifer and mixed conifer hardwood forests, including coastal temperate rainforest. They winter primarily in pine-oak woodlands of south-central Mexico and down into Baja, with small numbers recorded in southern Texas and the Gulf Coast, and even fewer in coastal Southern California.

Rufous hummingbirds tend to follow an oval shaped migratory route. In the spring they travel northward through the Pacific lowlands to take advantage of early flowering spring blossoms. Then, in mid- to late summer they return south, passing inland through the Sierra Nevada, ranges of the Great Basin and Rocky Mountains. Needing to refuel during their long excursion, it’s during their fall migration that rufous hummingbirds stop and pay a visit in Utah. Territoriality is not limited to the breeding season however, and its during migration when rufous hummingbirds are especially aggressive in defending temporary feeding territories, regularly displacing other species from flower patches they need for their nectar supply.

Studies have show that despite their somewhat smaller size, rufous hummingbirds have a greater wing loading—more weight per area of wing—than other species of hummingbirds. A higher measure of wing loading allows them to be more agile, although not as an efficient flier. This may seem to be a strange adaptation for a hummingbird with a migration distance of nearly 2,500 miles, but scientists have a possible explanation. They suggest the answer lies in how the rufous hummingbirds feed during their migration. Basically they take long flights followed by short stopovers at sites with nectar-rich flowers to build up fat reserves then take off on another leg of their trip. For this hummingbird, having the ability to acquire a territory easily, even during a short stay, appears to be more advantageous than greater efficiency during the flying portion of its migration. Bright colored male rufous hummingbirds can more readily challenge and drive off other hummingbirds than the more subtly colored females. The strategy they employ instead is to just sneak in and rob nectar until they are spotted and have to move on.

Rufous hummingbirds are also considered the most common vagrant species of the typically western hummingbirds. Often on their fall treks, individuals wander eastward towards the East Coast, and quite a number have been seen from Nova Scotia down to the tip of Florida. When they’re passing through Utah in July or August, you can bet they’ll catch your eye.

Hummingbirds in History

A Captivated Audience

Their dazzling eye-catching beauty and magical swiftness on the wing have led hummingbirds to figure prominently in the myths and legends of native cultures of the western hemisphere throughout time.

“Of all animated beings, this is the most elegant in form and the most brilliant in colour. The stones and metals polished by art are not comparable to this gem of nature.”

—Gorges Louis Leclerc,
L'histoire naturelle, 1775

The hummingbird played a major role in the religion of the Aztecs of ancient Mexico. In the Nahuatl language that Aztecs used, *huitzilin* was the word for hummingbird. Huitzilopochtli, whose name means “hummingbird of the south,” was an Aztec god of sun and war. One of their most important gods, he was portrayed with the head of a hummingbird fastened to the back of his head, or worn like a helmet. Legend tells he was born to Coatlicue, a goddess who conceived the child from a ball of hummingbird feathers that had fallen from the sky. Slain Aztec warriors were believed to be transported to the “mansion of the sun” to become reincarnated as radiant hummingbirds that dueled and practiced warrior skills. Aztec royalty and priests also wore cloaks decorated with glittering hummingbird feathers.

In one Mayan legend, birds wondering how to build a sturdy nest were sent by a tribal wise man to the hummingbirds for lessons. In another, the Great God was busy making birds for the world. When he finished, he noticed a tiny leftover pile of scraps, and not wanting to be wasteful, decided to make the smallest bird of all. He made a pair of hummingbirds and called all the other birds together to celebrate. Many bestowed gifts on the hummingbirds. The sun wanted to give a present too, so it shined its light down on the couple to make their feathers forever gleam and sparkle like gold and jewels.

In parts of Mexico and South America today, some people still believe hummingbirds possess special powers. Powder made from dried hummingbird bodies is worn in a special charm or amulet to attract a romantic interest, and to bring power and wealth. “Polvo de Chuparosa,” Spanish for powdered hummingbird, is sold in packets for use in rituals and also available commercially premixed in colognes, perfumes and special votive candles.

The Arawaks, an extinct tribe native to the Caribbean Islands believed that the hummingbird first carried the seeds of tobacco, a medicinal plant in their culture, to their people. It was known as the “doctor bird,” a label it still holds in the region. In a number the Dominican Republic and Puerto Rico, hummingbirds and parts of their nests are used to cure a variety of ailments such as earaches and asthma.

Tribes of the American Southwest—Hopi, Zuni and Pima—attributed hummingbirds, which they referred to in legends as “rain birds,” with the power to bring the summer rains because hummingbirds began nesting soon after the thunderstorm season. Pimas believed disturbing a nest could bring disastrous flooding. In Zuni culture Rain priests use hummingbird feathers in certain rituals. The symbol of the hummingbird is common on Pueblo decorations and costumes. In the Hopi tradition, Tócha, the hummingbird is one of the principle kachinas, or spiritual figures. Hopi fathers made special religious offerings, wing feathers of the birds tied to a long string and called road markers, to help their sons become as swift as the hummingbird.



Line engraving of feeding hummingbirds from pottery design used by the Mimbes culture of the southwestern United States, circa 1200-1300 A.D.

Hummingbirds appear as a similar force, providing an element of speed to overcome obstacles or enemies in myths of other Native American cultures as well, including those of Cherokee Indians and the Fox tribe. Navajos honored the hummingbird's swiftness and courage and considered it, along with the eagle and wolf, to be a symbol of bravery. In the Pacific Northwest, the spring arrival of the hummingbird was associated with good luck and fair weather by the 'Ksan people who related each year's new crop of salmonberries to pollination by hummingbirds.

Early European explorers of the West Indies were utterly fascinated by the amazing little hummingbirds they encountered. Christopher Columbus wrote of them in his journal. For an entry of October 21, 1492, he mentions, “little birds...so different from ours it is a marvel,” undoubtedly alluding to the tiny hummingbirds. A few years later, a beautifully feathered skin of a hummingbird was sent to Rome as a gift for the Pope. Previously unknown on the European continent, they became one of the mystifying wonders of the New World.

Explorers and traders brought living specimens back in captivity to intrigue and amuse the court. Many ended up dried and displayed in glass boxes.

Publishing accounts of 18 species, Carl Linnaeus in his 1758 scientific treatise, *Systema Naturae*, was the first to officially describe hummingbirds. Eighteenth century French naturalist, Georges Louis Leclerc de Buffon, also attempted to catalog and describe the world's hummingbirds. Instead of calling them hummingbirds though, he called them "flybirds."



Fashion illustration from Harper's Bazaar magazine in 1885.

Colonists in North America delighted in hummingbirds, and it was in New England in the early 1600s that the name "humbird" first came into common usage. Some believed a hummingbird landing by chance on a person indicated that person would soon have wealth and jewels as fine as the plumage of the hummingbird. Unfortunately, the lure of these feathered jewels was too great for wealthy Europeans who had never seen the birds in the wild. By the late 1800s dazzling hummingbird feathers were in high demand to decorate jewelry, hats, fans and dresses. Skins by the hundreds of thousands were shipped in barrels from ports in Columbia and Brazil to London and Paris, and auctioned to fashion designers. On March 21, 1888, a single auction in London recorded the sale of 12,000 hummingbird skins; the total for the year in that city alone exceeded 400,000.

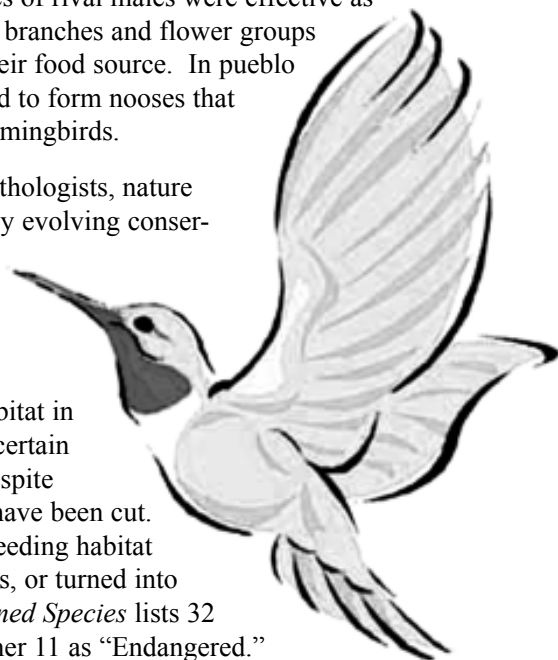
Hummingbirds with the most iridescent feathers were the most desired. Sometimes an entire preserved hummingbird along with artificial flowers topped a lady's hat, with the bird positioned to look as if it were hovering and dipping its bill into a blossom. The trend continued for several decades, peaking just after the turn of the century. Between 1904 and 1911 records from feather auctions in London, documented that 152,000 hummingbirds were imported from North America to make hats.

Collectors purchased stuffed hummingbirds to display and even described several new species from unusual skins they spotted at auctions. Among the most famous were the Duke and Duchess of Rivoli, a French couple for whom the magnificent hummingbird, *Eugenes fulgens*, formerly known as the Rivoli's hummingbird, was named. A few hummingbird specimens in European collections do not have known living counterparts, and may have gone extinct from over-collection during those years.

How were bird hunters able to meet the tremendous demand? They honed their skills trying different techniques. Medium-sized versus smaller shot, which penetrated the body, was considered better since it killed the bird by smashing it without destroying the feathered skin. Other hunters met success by shooting small water-filled balloons made from animal intestines or other materials. Natives in South America preferred blowguns. Especially skilled hunters, they were even able to hit the tiny targets in flight. Mesh nets hung around flowering trees near territories of rival males were effective as well. In the Caribbean Islands, a glue made from plants was used to coat specific branches and flower groups hummingbirds tended to visit. Unsuspecting hummingbirds became trapped to their food source. In pueblo cultures of North America, long, thin fibers from animals such as horses were used to form nooses that were placed around blossoms of the Rocky Mountain bee plant, a favorite of hummingbirds.

The lust for hummingbird feathers however did not go on without criticism. Ornithologists, nature lovers, social commentators and others publicly objected, and eventually efforts by evolving conservation organizations such as the Royal Society for the Protection of Birds in Great Britain and the Audubon Society in the United States helped turn the tide towards conservation of hummingbirds versus their exploitation. Passage of the Migratory Bird Treaty Act in 1918 afforded them more official protection.

The outlook for hummingbirds in the United States is generally good. Loss of habitat in some Central and South American countries though has had negative impacts on certain species of tropical hummingbirds and some that migrate as well. For example, despite conservation efforts, in Costa Rica, since 1940, more than half the native forests have been cut. Flowering and understory plants that hummingbirds depend upon for food and breeding habitat are wiped out as forests are cut and replaced by banana, citrus or cacao plantations, or turned into cattle pastures. The 2002 World Conservation Union (IUCN) *Red List of Threatened Species* lists 32 species of concern, of which 9 are classified as "Critically Endangered" and another 11 as "Endangered."



Today, interest in many birds, including hummingbirds, has fortunately helped stem further declines in species. Instead of wearing hummingbirds on their hats, people are showing their admiration by collecting images of them on everything from t-shirts, to mugs to shower curtains, and wearing earrings and necklaces with dangling hummingbird charms. People are also putting up feeders and planting gardens full of nectar-bearing flowers to feed these beloved birds, and enthusiasts from around the world gather at hummingbird festivals to exchange anecdotes and share in their love of hummingbirds.

Objectives: Students will: 1) learn about the energy dynamics of hummingbirds; 2) gain an understanding of factors that can influence the day-to-day energy balance and survival of hummingbirds.

Overview: Students engage in a simulation in which they, as hummingbirds, face factors that either help them gain the energy they need to sustain their lives or lead them to be unable to survive.

Background: For their size, hummingbirds burn energy faster than any other warm-blooded animal. This is because small animals like hummingbirds have more surface area compared to their volume (mass), and the greater the ratio (surface area:volume), the faster heat is lost to the surrounding air. To understand this, think about two fresh-baked desserts from the oven, a 10-inch pie and a 3-inch tart. Which will be the first to cool down enough to eat?

To counteract the fast loss of heat due to their size, hummingbirds have a very high metabolic rate—the rate at which they burn energy to create body heat. To meet their energy needs a hummingbird needs to consume about 10 Calories each day. That doesn't seem like much, but a person with a comparable metabolism would require 165,000 Calories in food per day. (That's more than 80 times the amount of Calories a person would normally need.)

To generate the heat they need to stay warm and survive, hummingbirds rely on the energy-rich flower nectar of which they must consume at least $\frac{1}{2}$ their body weight every day. Harvesting nectar from flowers though can be quite tricky but hummingbirds have figured it out. They are able to hover in front of flower blossoms allowing them to insert their long bill and lap up the nectar with their tongue. Hovering though, which requires a hummingbird to flap its wings extremely fast, ironically is very costly in terms of energy, placing hummingbirds forever in a predicament—they need the energy that nectar provides, but getting that nectar requires all the energy they have!

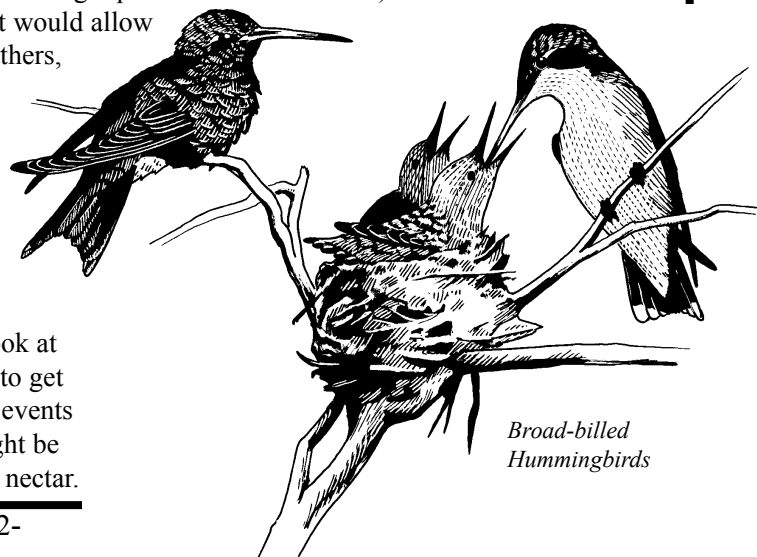
Urgently in need of nectar, over the course of a day, a hummingbird must visit more than a thousand flowers. Trapped in this desperate race against time, just one bad day of foraging or even a few hours without food can spell death for a hummingbird. Many factors can influence how successfully a hummingbird is able to gather its life-sustaining fuel.

Materials: Sets of cards with factors that can influence hummingbird nectar-gathering success (1 set per group of 3 students) and one hummingbird survival tally sheet per student. (See following 2 pages). One die per group (optional).

Procedure: Form groups of 3 students. Pass out a stack of cards face down to each group and the tally sheets. Tell students they are going to become hummingbirds foraging for nectar to fill their daily energy needs. Discuss background information above. Explain that there are many factors that can help or limit their success in finding enough nectar to survive. Tell them they are to take turns picking up and reading aloud a card from the stack to their group. Starting with 30 points, for each turn explain how they are to keep a tally of the number of points they gained or lost by adding or subtracting the number of points printed on the card. To make it a bit more challenging, have students roll the die and multiply the points (+ or -) specified on the card by the number rolled. When they are done with their card, have them place it in a separate pile. When the original pile runs out, have them shuffle the new pile before continuing on.

The tally sheet covers a period of 3 days in a hummingbird's life. Those who end up with 30 or more points manage to get enough nectar to meet their energy demands and survive. This is because a hummingbird needs about 10 Calories per day. If the hummingbird was able to maintain at least the 30 points (assuming 1 point = about 1 Calorie) it started with then it was able to just break even. More than 30 points is better since it would allow the hummingbird to do other daily activities such as preening feathers, bathing in water, or hawking for insects to inject the protein they need as well. The energy needed by female hummingbirds is even greater since females are responsible for all aspects of raising the young, from building the nest to incubating the young, and then feeding them as they grow. If the hummingbird's total dropped below 30 points it burned more energy than it was able to gather and did not survive.

Evaluation: Discuss the results with the class. Have students look at their list of factors that influenced whether or not they were able to get enough energy to survive. Have them divide factors into natural events versus things that people do. Have them think of things they might be able to do to help make it easier for hummingbirds to get enough nectar.



*Broad-billed
Hummingbirds*

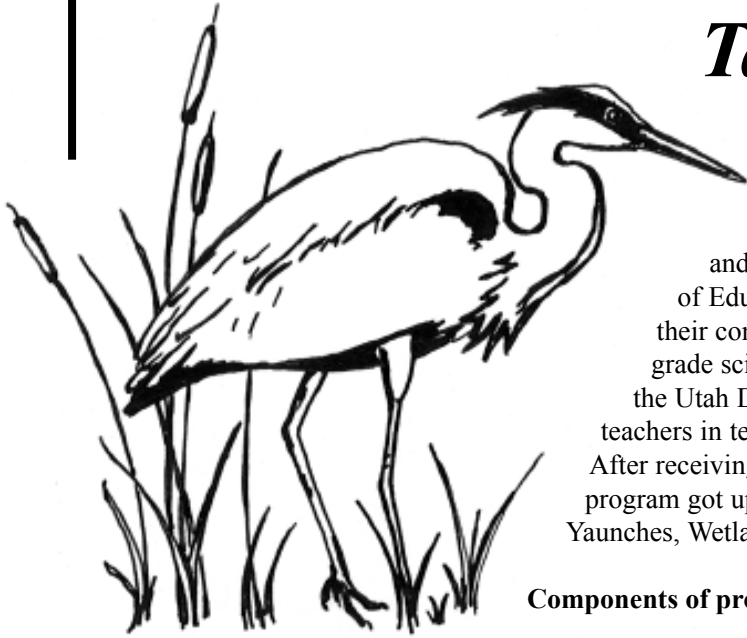
Few rivals have entered your territory so you have not had to spend energy driving them off. Add 12 points.	You spent a lot of energy getting untangled from a spider's web you flew into. Lose 5 points.	A persistent intruder is making you spend extra energy defending your sources of nectar. Lose 5 points.
The feeder in your territory was not filled today as it usually is. Someone forgot. Lose 5 points.	The owner of a yard near your territory decided to plant a garden full of nectar-rich flowers. Add 15 points.	A new feeder full of fresh sugary water was added to the garden where you have your territory. Add 12 points.
A heavy downpour of rain for several hours kept you from being able to forage for nectar. Lose 4 points.	Beautiful weather is keeping the flowers in your territory blooming with vigor. Add 9 points.	Flowers in your territory were accidentally not watered when it was really hot so they wilted away. Lose 5 points.
Flowers in your territory died when someone sprayed a weed killer on the grass. Lose 6 points.	You spent a lot of energy impressing a female you wanted to attract (for boys). or You spent a lot of energy building your nest (for girls). Lose 5 points.	Nectar-robbing insects plunder nectar from the flowers in your territory. Lose 3 points.
Light spring rainfall allows an abundance of flowers to bloom in your territory. Add 8 points.	Someone filled the feeder in your territory with honey water instead of sugar water. You could get a fungus infection on your tongue if you drink it so you don't. Lose 3 points.	An unexpected cold snap that came through froze blossoms in the garden within your territory. Lose 4 points.

Hummingbird Survival Tally Sheet:

For each card you pick, list what happened and tally the number of points gained or lost as stated on the card.

[illegible]

New Wetlands Education Program Takes off in Utah!



Did you know that although Utah is mostly a desert, there are many different ecosystems within the desert biome, even wetlands? In deserts, wherever there is water there is an abundance of life, especially in wetlands. The importance and value of wetlands has been recognized by the Utah State Office of Education, which has now included education about wetlands and their conservation as a major component of the core curriculum for 4th grade science. As a result of this inclusion, the Project WILD program of the Utah Division of Wildlife Resources (UDWR) saw a need to assist teachers in teaching their students about wetlands, especially in a field setting. After receiving a grant from the U.S. Environmental Protection Agency, the program got up and running in December, 2002 with the hiring of Gabrielle Yaunches, Wetlands Education Program Coordinator.

Components of program include:

- **Assisting sites** that celebrate Wetlands Month (May) and International Migratory Bird Day in bringing these events into the educational arena. This includes the creation of an annual wetlands educational packet meant to be used by 4th graders and their teachers, but general enough to be used by a wider audience.
- **Creating a wetlands activity guide** to be used by 4th grade teachers in Utah. The guide will include both field and school-based activities that are Utah specific. In fact, the most important aspect of the guide is the inclusion of field activities. Taking students to a wetland is really the best way for them to learn about this important ecosystem.
- **Training teachers and volunteers** in leading the activities in this guide. We want teachers to feel as confident as possible in their knowledge about wetlands and in their ability to disseminate that information to their students.
- **Identifying wetland sites** where teachers will be able to bring their classes.
- **Making wetlands educational trunks** to place in each regional office of the UDWR for teachers to check out.

This May a special Wetlands Month Education Activity Packet titled “**What Are Wetlands?**” was developed for this annual event. This excellent packet can be viewed and downloaded from the Division’s website at www.wildlife.utah.gov/wetlandsed. The wetlands activity guide should be completed by the end of the summer of 2003. Then we will begin to search for suitable wetland education sites throughout the state, and train teachers and volunteers in the program.

If you would like to receive more information about the program, please complete the form below and send to: Gabrielle Yaunches, Utah Division of Wildlife Resources, PO Box 146301, Salt Lake City, UT 84114-6301 or e-mail the information to gabrielleyaunches@utah.gov.

Wetlands Education Contact Information

Name: _____ Are You a teacher? _____

Address: _____
City State Zip

School District: _____ School: _____ Grade(s): _____

Phone: () _____ work, home or cell? E-mail: _____

project WILD



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Thanks Much!

—especially if you already have.